ICD Update: January Shutdown Work

Lee Sawyer

On behalf of

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(Univ. of Texas – Arlington),

Qun Yu, Alan Stone, and ibid.

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(Some of) The Cast of Characters

Mark Sosebee

Andy White

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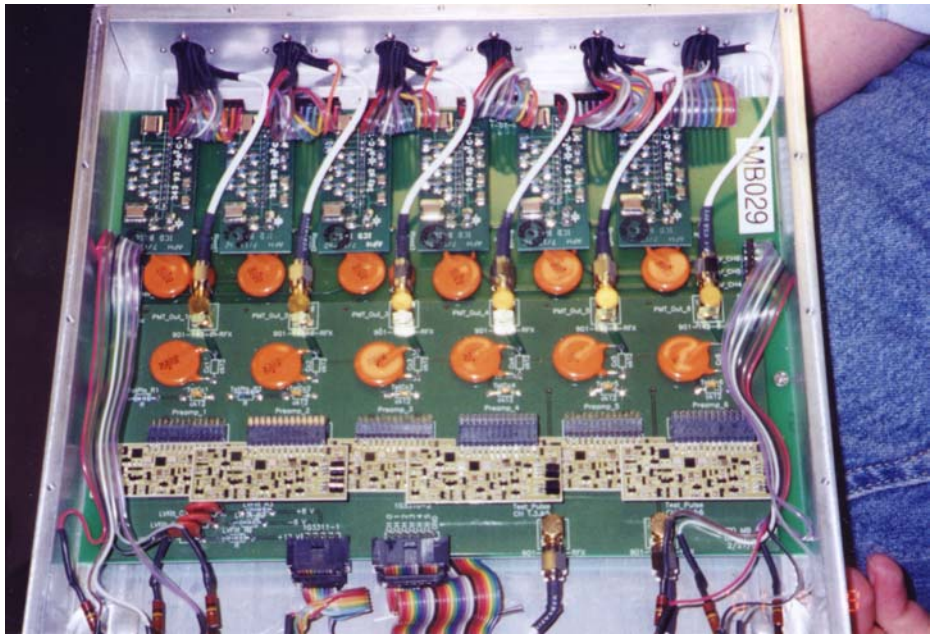
Object of January Shutdown

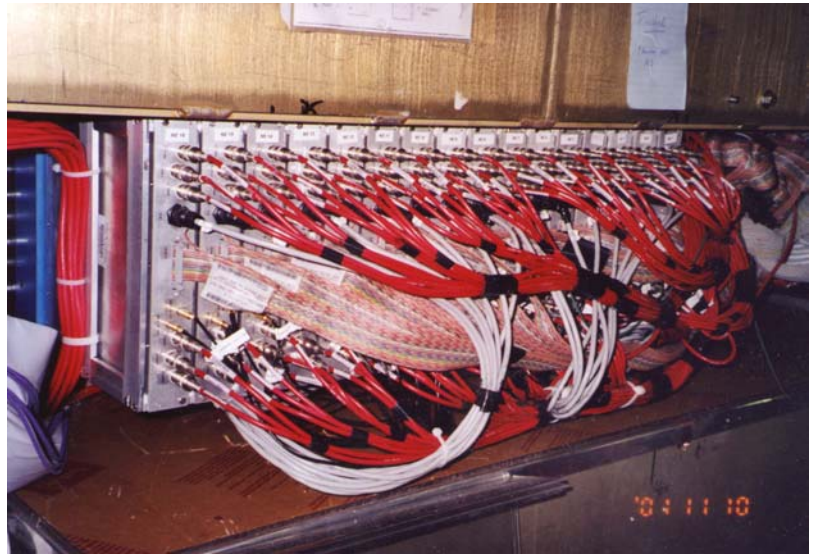
- **Fix Everything!**
  - When the ICD-N was installed in Fall, 2001, we knew we had some questionable channels.
  - Other channels weakened or failed since then
    - Both electronics problems (preamp pulser)
    - And PMT or related problems (LED pulser)
    - On the order of 5% dead/bad channels by January
  - Spare motherboards, HV divider cards ("bases"), and replacement drawers were prepared in anticipation of the shutdown.
  - New PMTs ordered
    - Past the advertised lifetime for these tubes
    - But we run at low voltage => relatively low integrated current.
    - We anticipated on the order of 10% PMT replacement per year.

Drawer Repairs

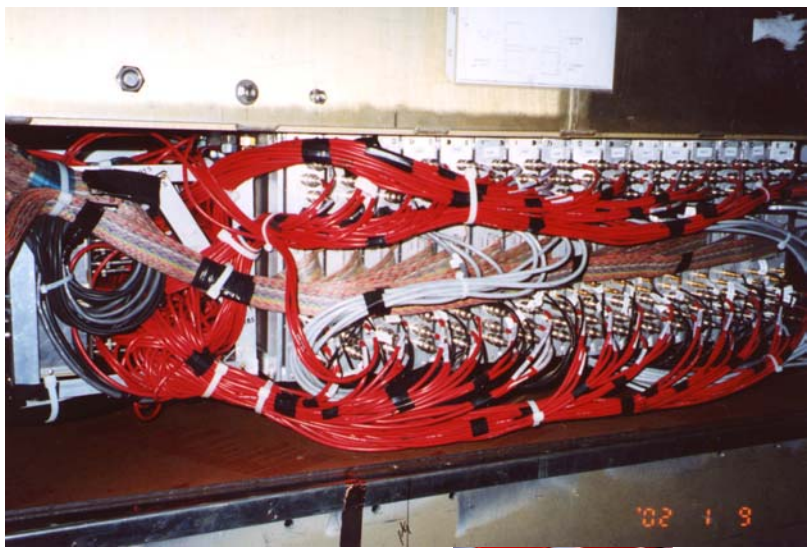
- Only pulled drawers from the North Endcap
  - South has been in good shape since installation
  - Maybe two low channels that we would have liked to have examined on the teststand
  - Possibility of creating new problems when drawers are pulled => Law of Diminishing Returns sets in!
- Total of 18 Drawers Pulled
  - Roughly equal number from NE and NW.
  - Major effort to uncable/recable an entire crate.

ICD Drawers





NE Crate



NW Crate

Documentary evidence that professors occasionally do work...

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Repair Summary: NW

NW1-CH1: Replaced PMT#9056 with PMT#7968
NW1-CH2: Replaced signal line (from socket to motherboard)
NW1-CH3: Replaced signal line (from socket to motherboard)
NW1-CH4: Replaced base
NW3-CH3: Replaced preamp
NW4-ALL: Replaced entire drawer with spare
NW5-CH4: Replaced base
NW5-CH5: Replaced preamp
NW6-CH4: Replaced base
NW7-CH5: Replaced base
NW8-CH1: Replaced base
NW8-CH4: Replaced preamp
NW9-CH1: Replaced base and preamp
NW10-CH4: Replaced base
NW10-CH6: Replaced PMT#7906 with PMT#4839
NW11-CH2: Replaced PMT#5486 with PMT#8752
NW16-ALL: Replaced pulsar connector P135

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Repair Summary: NE

NE5-CH1: Replaced base, replaced PMT#4094 with PMT#7979
NE5-CH2: Replaced base
NE5-CH3: Installed spring posts (missing)
NE5-CH4: Replaced base, installed spring posts (missing)
NE5-CH5: Installed spring posts (missing)
NE5-CH6: Relaced PMT socket, installed spring posts (missing)
NE6-CH2: Replaced preamp
NE6-CH3: Replaced base and preamp
NE7-ALL: Replaced entire drawer with spare
NE7-CH4: Replaced PMT#7487 with PMT#8019
NE11-CH2: Replaced base
NE11-CH6: Replaced preamp, replaced PMT#8011 with PMT#7480
NE13-CH3: Replaced base
NE14-CH4: Replaced base
NE14:CH6: Replaced base
NE16-CH1: Replaced base

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Radioactive Source Testing

- Andy White and Mark Sosebee also source tested 4.5 supertiles in the NE
  - Confirms mapping of an additonal 54 channels
  - Both top and bottom NE quadrants tested
  - Confirms mapping fixes to CalChan.cpp
  - In addition to sources testing previously done on other quadrants.
- We are now confident in the ICD mapping
- Source testing is tough
  - Signal hard to distingiush from noise
  - Need a strong source to penetrate Aluminum box

Conclusions

- Every ICD channels is being readout
  - Two weak channels in North and two in the South
  - A couple of other problems (pulser cable or pulser card in F/O) that do not hamper readout, but debugging a problem in the future.
  - New PMTs still need to have the High Voltages adjusted
    - Andy W. will do it this week.
  - Still need to verify teststand MIP response in situ
    - This may be a long-term goal
    - Should teststand channel-to-channel variations be used without verification with collider muons?
  - Still need to finalize ICD weighting in reconstruction.

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